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Translation of Jpn. Pat. Appln. KOKOKU Publication No. 31-9364

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Method for Manufacturing an Injection Needle

Brief Description of the Drawings

FIG. 1 is an explanatory diagram showing an example of an apparatus to work the present invention.

FIG. 2 is a longitudinal sectional view of an injection needle produced by the present invention.

Detailed Description of the Invention

The present invention relates to a method for manufacturing an injection needle, in which the diameter of the needle is large in its proximal portion and gradually decreases toward the distal end, and more particularly to an electrolytic polishing method, wherein the time during which the needle is immersed in an electrolytic solution is gradually increased from the proximal portion toward the distal end to vary the amount of electrolytic polishing, so that the injection needle can be tapered An apparatus for implementing this method will be described with reference to FIG 1. An electrolytic cell 1 contains an electrolytic solution 2 A needle holding member 3 can be moved up and down in the electrolytic solution A needle material 4 is held in the needle holding member 3 A power source 5 is connected to the cell 1 and the needle holding member 3 so that a current flows between the electrolytic cell 1 and the needle material 4.

The needle holding member 3 is lowered at a constant speed and the needle

material 4 is entirely immersed in the electrolytic solution 2. Then, the needle material 4 is raised from the solution at a constant speed. The speed of the up-and-down movement of the needle material is adjusted according to the length of the needle. For example, assuming that the length of the needle is 40 mm and the speed of the up-and-down movement is 2 mm/sec, the distal end portion of the needle is electrolyzed for 40 sec, whereas the proximal portion is electrolyzed only for a moment. Since the diameter of the needle material is uniform, the amount polished by this process is large in the distal end portion and small in the proximal portion. Therefore, the needle is tapered.

The following is a working example of this invention.

I. Conditions of Electrolysis

(1) Electrolytic Solution

phosphoric acid	2000 cc
sulfuric acid	1500 cc
water	500 cc
additive	300 cc

(2) Temperature of Solution 40 °C

(3) Voltage 15 V

(4) Current Density 600 A/dm^2

II. Actual Measurement

The distal end portion of the cannula, which moves up and down along the bearing, is immersed in the electrolytic solution for a long time The shorter the distance from the proximal end, the shorter the electrolysis time. Actual measured values of the current and the amount of polishing are indicated in the table below As clear from the table, the cannula is tapered.

Distance from distal end	Current	Amount of polishing (dia.)	Electrolysis time
10 mm	3.0 A	0.075 mm	35 sec
20 mm	3.6 A	0.045 mm	25 sec
30 mm	4.5 A	0.015 mm	15 sec
40 mm	5.2 A	0.005 mm	5 sec

When the cannula having an outer diameter of 0.80 m/m, a thickness of 0.17 m/m and a length of 45 mm is electrolyzed, the outer diameter and the thickness at the distal end is decreased to 0.725 mm and 0.138 mm, respectively. As a result, a tapered injection needle material as intended can be produced.

It was known that the tapered injection needle is advantageous in respect of the resistance to bending, and little pain and wound. However, it was very difficult to mass-produce uniform tapered needles by machining or the like. According to the method of the present invention, uniform products can be produced in large quantities very easily.

What is claimed is

A method for manufacturing an injection needle by electrolytic polishing, characterized in that the time during which a needle material is immersed in an electrolytic solution is gradually increased from a proximal portion toward a distal end, so that the needle material can be tapered.

Ref. 1

12 A 13
(94 A 51)

特許庁

特許出願公告

特許公報

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公告 昭31.11.2　出願 昭30.7.7　特願 昭30—18476

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（全2頁）

注射針の製造法

図面の略解

第1図は本発明を実施する為の装置の一例を示す説明図、第2図は本発明によつて製造された注射針の縦断側面図である。

発明の詳細なる説明

本発明は注射針に於て其の根部の径を大とし先端方向に行くに従つて其の径を順次小ならしめたものを製造するのに電解研磨加工法を施す際其の根部より先端に行くに従い電解液中に浸漬されている時間を順次長くして電解研磨量に変化を与えて先細状に加工する製造法に係り今此の方法を実施する装置を図面第1図について説明すれば1は電解槽で中に電解液2を収容し之に上下に移動し得る針保持具3を設け針材4を之に定着保持せしめ、電流を電解槽1と針材4との間に流すように電源5に連結する。

而して針保持具3を一定速度で下降させ針材4の根部迄電解液2中に浸漬し次に又一定速度で上昇せしめ液から引上げる。針材の上下動速度は針の長さにより調節するが今一例として針の長さが40mmの場合其の上下動の速度を2mm/secとする*と針の先端部は40secの間電解され針の根部は瞬間的にしか電解されない。針材は全体の直径が一様であるからこの加工によつて先端部は研磨量が大で根部は少いから針の外径はテーパー状に仕上げられる。

本発明の実施例を挙げれば次の通りである。

Ⅰ電解条件

（1） 電解液

燐酸	2000cc.
硫酸	1500cc.
水	500cc.
添加剤	300cc.

（2） 液温　40℃

（3） 電圧　15V

（4） 電流密度　600A/dm²

Ⅱ実測

針管が軸承にそつて上下する針管の先端部は長時間電解液に浸されて電解され針管の根部に行くに従つて電解される時間は少くなる。このときの電流と研磨量の実測値は下表の通りで、針管はテーパー状に仕上げられる。

針管先端よりの距離	10m/m	20m/m	30m/m	40m/m
電流	3.0A	3.6A	4.5A	5.2A
研磨量（直径）	0.075m/m	0.045m/m	0.015m/m	0.005m/m
電解時間	35秒	25秒	15秒	5秒

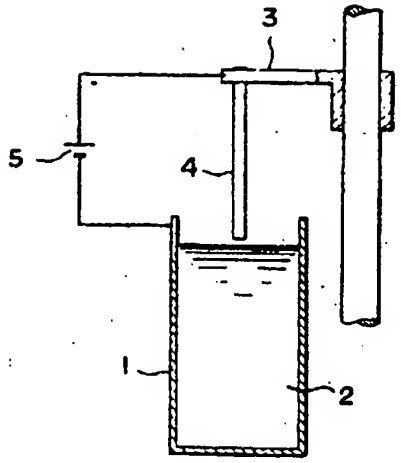
以上の条件にて外径0.80m/m、肉厚0.17m/m長さ45m/mの針管を電解すると先端は外径0.725m/m、肉厚0.138m/mとなり所期の目的たるテーパー注射針の素管を作ることが出来る。

従来テーパー注射針が曲げ抵抗の点や痛み傷口の小なる点等に於て優秀である事は知られていたが之を機械加工其の他によつて均一の品を量産する事は誠に困難であつたが本発明の方法によるときは極めて容易に均一品を量産する事が出来る。

特許請求の範囲

針材を其の根部より先端部に行くに従い電解液中に浸漬されている時間を長くして電解研磨を行いテーパー状と為す事を特徴とする注射針の製造法。

第1図



第2図